

REMARKS

Reconsideration and allowance are respectfully requested. The amendments are supported by the original disclosure and, thus, no new matter is added by their entry.

Claims 1-3, 8-10 and 15-20 are pending. Claim 3 is reformatted as an independent claim, which has scope identical to the original claim because only the limitations of claims 1-2 were incorporated. Only claims 1-3 read on the elected invention. Cancellation of claims 4-7 moots the Section 103 rejection.

Claim 8 is amended to conform to the scope of claim 1. Applicants request the rejoinder of nonelected claims 8-10 and 15-20 after the elected claims are allowed.

35 U.S.C. 102 – Novelty

A claim is anticipated only if each and every limitation as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is claimed. See *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1-3 were rejected under Section 102(b) as allegedly anticipated by IT 1306004, which was patented by the present inventors. Applicants traverse because the process taught in the '004 patent is not identical to the process recited in the present claim 1 as alleged on page 4 of the Action. Therefore, there is no reason to believe that the polymeric material produced thereby is the same, nor that the polymeric material of the '004 patent would have the same properties as those recited in the present claim 1.

The Examiner relies on Examples 1-2 of the '004 patent that disclose a syndiotactic polystyrene material made by a process using 15%wt styrene and 15%wt toluene as solvent. The polymeric material of the '004 patent was made by guest removal (e.g., a process using supercritical CO₂) from δ clathrate samples. It is worth noting that the literature relating to s-PS clathrate samples clearly reports that the guest content is generally lower than 20 wt%. In Example 2 of the cited '004 patent, toluene was 15wt%.

One of ordinary skill in the art would have recognized that absorbing this amount of solvent in polymeric material would usually result in a plasticized polymer. Moreover,

the glass transition temperature and the elastic modulus of the polymer would remain essentially unaffected due to the absorption of most solvent molecules as guest in the ordered cavities of the crystalline phase rather than the amorphous phase, even after the absorption of 20% of guest molecules.

By the process taught in the '004 patent, physical gels would not form. In fact, the present claim 1 requires that polymer concentration in the intermediate gel (i.e., prior to solvent removal) is in a range between 0.1 and 50 wt%, which corresponds to a solvent concentration in a range between 50 and 99.9wt% at most. Therefore, 15wt% toluene in the '004 patent does not necessarily teach a solvent concentration in the latter range.

The above is also consistent with the widely-accepted understanding that “gels” are systems in which solvent represents the major component (see, for example, the Introduction of *Thermoreversible Gelation of Polymers and Biopolymers*, J.-M. Guenet, Academic Press, 1992; a copy is attached for the Examiner’s consideration).

By contrast, Applicants’ present specification teaches dissolving the syndiotactic polystyrene material in a 10wt% solution. Thus, there is 90wt% solvent because the rest of the solution is solvent. It does not mean that the solution contains only 10wt% solvent as the Examiner appears to have misunderstood reading this specification and the '004 patent. In accordance with the presently disclosed process, a physical gel is produced (see paragraph [0042] of the published US application). The process taught by Applicants in the present specification was not disclosed in their prior patent. Therefore, the '004 patent does not anticipate claims 1-3.

Moreover, although the '004 patent discloses the production of polymeric materials exhibiting a nanoporous crystalline phase, they always have an apparent density greater than 1 g/cm³. On the other hand, the polymeric materials of present claim 1 are required to have an apparent density of 0.001 – 0.8 g/cm³. This difference is due to the fact that the processes disclosed in the '004 patent and the present specification are different.

Finally, the negative limitation of claim 3 requires the gel produced by the recited process is a physical gel characterized by the absence of chemical cross-links between polymer chains. But there is no evidence cited in the Action to support a belief that the

claimed physical gel lacks chemical cross-linking. In particular, the lack of an express statement that the '004 patent teaches a composition that does not contain chemical cross-links is not sufficient basis for disclosing this negative limitation. Thus, the '004 patent does not contain a disclosure satisfying Section 112, first paragraph, requirements for the exclusion alleged on page 4 of the Action. Cf. M.P.E.P. § 2173.05(i) ("The mere absence of a positive recitation is not basis for an exclusion").

The cited '004 patent does not anticipate the claimed invention because it does not disclose all limitations of the original claims. The identical invention must be shown in as complete detail as is claimed. See *Richardson* at 1920. If this rejection is maintained, acceptable evidence or reasoning must be provided in the next Office Action to support any allegation of inherency or that a prior art product's possesses inherent characteristics. Thus, the requested evidence or reasoning would be a new rejection that would require Applicants be given the opportunity to rebut fully.

Withdrawal of the Section 102 rejection is requested because the '004 patent fails to disclose all limitations of the presently claimed invention.

Conclusion

Having fully responded to the pending Office Action, Applicants submit that the claims are in condition for allowance and earnestly solicit an early Notice to that effect. The Examiner is invited to contact the undersigned if additional information is required.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /Gary R. Tanigawa/
Gary R. Tanigawa
Reg. No. 43,180

901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

to my parents

to Chantal, Aurélie and Delphine

Thermoreversible gelation of polymers and biopolymers

Jean-Michel Guenet

*Laboratoire d'Ultrasons et de Dynamique des Fluides Complexes
CNRS URA 851-Université Louis Pasteur
STRASBOURG
FRANCE*



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Introduction

*"La dernière chose qu'on trouve en faisant un ouvrage est
de savoir celle qu'il faut mettre la première."
Blaise Pascal in Les Pensées.*

If one were asked how to retain a liquid, it would probably occur to one that any plain container would do and that such a question is definitely silly. However, there does exist another way in which large amounts of liquid can be kept "solid", namely by using a gel. A gel possesses the unique property of incorporating and retaining a proportion of liquid molecules outweighing by far the proportion of the basic component. In some cases a gel can contain up to 99% solvent.

The widely accepted topological definition of a gel is therefore a three-dimensional network constituted of basic elements connected in some way and swollen by a solvent. As a rule, only systems wherein the solvent represents the major component are considered as gels.

Among the large number of systems that are liable to form three-dimensional networks (e.g. steroids, vanadium oxide, polymers), gels prepared from either synthetic polymers or biopolymers have received and are still receiving considerable attention. These gels, referred to as polymeric gels, break down into two main categories depending upon the process whereby the elements of the network are connected: **chemical gels** and **physical gels**.

In **chemical gels** the connection usually occurs through covalent bonds. Covalent bonds are very strong links so that a cross-link usually consists of one multifunctional molecule. As a result, the junction zone possesses a size similar to the monomer unit and may be regarded as point-like as far as macroscopic properties are concerned. Also, as covalent bonds are not only localized on the junction point but also constitute the polymer chains joining the junction points, these gels are "heat-irreversible": heating this type of chemical gel to the point where covalent bonds break up. This ultimately entails irreversible degradation which impedes the re-formation of a similar system.

There do exist gels that can be termed reversible chemical gels. These occur through ionic complexation. One well-known example is the borax-galactonannan system (see for instance Peron *et al.*, 1988).